

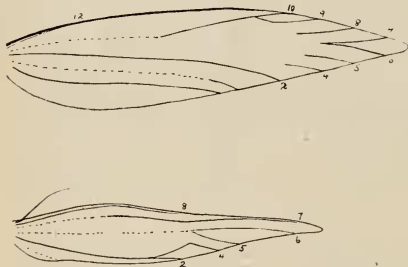
NEW GENERA AND SPECIES OF TINEINA.

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Several species of Tineid moths in the writer's collection belonging to genera apparently new are of considerable interest because of their phylogenetic significance or because they show relationship to isolated genera or groups of genera. The present paper includes the description of these genera, together with descriptions of a number of new species recently bred. The types are in the writer's collection.

Corythophora, new genus.

Face smooth; head elongate, with an erect tuft between the antennæ. Antennæ $4/5$, basal segment enlarged and concave beneath to form an eye-cap, with pointed projecting flap of scales anteriorly. Labial palpi moderate, drooping, smooth-scaled. Maxillary palpi rudimentary.

Fig. 18.—Venation of *Corythophora aurea*.

First segment of anterior tarsi thickened with scales; posterior tibiae hairy.

Fore wings elongate ovate, costa thickened for two-thirds its length; 1b simple, 3 absent, 6 and 7 connate, 9 and 10 arising near costa, 11 absent; transverse

vein absent between 2 and 9. Hind wings $2/3$, narrow, lanceolate, cilia 4; 3 absent, 5 and 6 stalked, transverse vein absent between 4 and 5. (Fig. 18).

Type—*Corythophora aurea*.

The relationship of this genus to *Leucoptera* Hb., *Crobylophora* Meyr., and *Proleucoptera* Busck., is suggested at once by the general appearance of the insect, and a study of all the characters substantiates this view. It is a much earlier form and undoubtedly indicates the stem from which the genera of this group have sprung.

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although the genus in its present form has acquired a number of specialized characters.

The neuration of the fore wings in the three genera just mentioned can easily be derived from that of *Corythophora*. The absence of vein 11 is not significant, but is of recent disappearance, as it is virtually absent in one species of *Proleucoptera* while present in the other, and thus can not be considered as a character of importance. However, the fact that vein 4 is here present and occupying its normal position would suggest that a slightly different interpretation should be put upon the venation of *Proleucoptera*, viz., that vein 3 is absent and not 4, as stated by Mr. Busck in his characterization of that genus.

The derivation of the neuration of the hind wings of the younger genera from this type is not so obvious. However, the examination of the hind wing of *Proleucoptera smilaciella* Bsk. discloses a feature hitherto overlooked, which shows clearly its origin from the present genus. As shown in the accompanying figure (Fig. 2), veins 5 and 6 are stalked from the base and distinctly separate from 7 toward base, but almost anastomose with it along the middle of the wing, becoming separate again where they branch.



Fig. 19.—Hind wing of *Proleucoptera smilaciella*

Its affinities with Tineid stock are at once apparent; in fact, its neuration closely approaches that of some of the Tineid genera. This furnishes strong confirmatory evidence of the descent of this group from the Tineidæ, from which it has been regarded as derived.

Corythophora aurea, n. sp.

Head and appendages very pale yellow, flap of scales on basal segment of antennæ somewhat deeper yellow.

Thorax pale yellow or white, patagia golden yellow. Fore wings golden yellow, deepening toward the apex, where the colour is deep orange. Costal margin from $1/5$ to just beyond the beginning of the cilia, and dorsal portion of the wing below the fold, pale yellow, fading almost to white on the extreme margins.

Legs pale yellowish white, except the anterior tibiae and tarsi, which are dark brown externally.

Expanse: 9-9.5 mm.

Two males, Cincinnati, O., July 13, and Balsam, N. C., July 22.

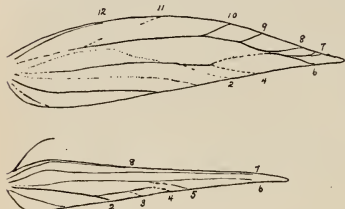


Fig. 20.—Venation of *Apophthisis pullata*

The erect tuft and position of the antennal flaps which project obliquely forward in the dead insect give this species a very striking appearance.

Apophthisis, new genus.

Head with appressed scales, antennae somewhat under 1, basal segment with pecten. Labial palpi moderate, straight, drooping. Maxillary palpi rudimentary.

Posterior tibiae with a row of short projecting scales above.

Fore wings lanceolate, the margin from the inner angle to the apex is almost straight or slightly concave; 2 almost obsolete, 3 absent, 4 indistinct, from lower angle of the cell, 5 absent, 6 and 7* stalked, transverse vein indistinct between 4 and 6, 11 obsolete except at origin and near costa. Hind wings about $\frac{1}{2}$, lanceolate, cillia 5; 5 and 6 stalked. (Fig. 20).

Type: *Apophthisis pullata*.

A very peculiar genus, apparently most closely allied to *Stomphastis* Meyr., with which it agrees in some characters. The loss of vein 5 of the fore wings is a feature not found elsewhere in the *Gracilariadæ*, where modification usually results in the loss of vein 6.

In any group it is possible within certain limits to determine which veins are absent, if the primitive type of colour pattern is known. Elsewhere† it was shown that the tips of veins mark the extremities of unpigmented (white) fasciæ, separating the primitive transverse bands of colour. Thus, in *Lithocolletis*, the primitive colour pattern consists of a series of seven transverse bands, separ-

*In the specimen denuded, 7 is branched near the costa, as shown in the figure; this is probably an individual abnormality.

†Braun. Evolution of the colour Pattern in the Microlepidopterous Genus *Lithocolletis*, Jn. Acad. Nat. Sci. Phila., XVI, 105-167, 1914.

ated from one another by white fasciæ. The last of these bands crosses the tip of the wing. The costal extremity of the white fascia preceding it lies over the tip of vein 7, but there is no vein at its extremity on the termen. The extremities of the sixth band lie between veins 7 and 9 on the costa, and just beyond vein 5 on the termen. The white fascia preceding this band lies over the tip of 9 on the costa, and over the tip of 5 on the termen. This general type of colour pattern may be regarded as primitive not only for *Lithocolletis* alone, but for the entire family *Gracilariadæ*. In more ancestral forms, where all the veins are present, the tip of vein 6 occupies the position marked by the extremity of the last white fascia, that is it is almost opposite the tip of vein 7. This must be regarded as the normal position for vein 6 in this group. Therefore, in *Lithocolletis*, where no vein is present at the extremity of this fascia on the termen, we must regard vein 6 as the vein which is absent, as has been done in the more recent literature on the group.

In *Apophthisis*, the last vein to reach the termen before the apex occupies the normal position of vein 6. For this reason, vein 5 has been here regarded absent, in a group where it is, with this exception, uniformly present.

***Apophthisis pullata*, n. sp.**

Head and palpi gray, antennæ gray with paler annulations. Fore wings clothed with sordid grayish white, fuscous-tipped scales, giving the wing in general a speckled gray appearance. An indistinct black streak in the fold from near base to one-third, a second shorter streak in the fold beyond it. The scales around the apex form an indistinct line in the gray cilia. Hind wings gray.

Legs gray; tibiæ tipped with white; tarsi annulate with white. Expanse: 5.5-6 mm.

Two specimens, both males, near Cincinnati, O. The larva is a miner in leaves of buckthorn (*Rhamnus lanceolata* Pursh.) The mine lies deep in the leaf substance; linear at first, gradually broadening into an irregular blotch, 5 or 6 mm. wide, and occupying about one-fourth of the area of the leaf. The leaf retains its green colour, so that the mine is not plainly visible during the

early stages; in the later portions of the blotch, the substance of the leaf is consumed, rendering the mine distinct. Pupa outside the mine in broadly oval, flat, yellow cocoon spun in a fold of the leaf or in a crevice.

There are two generations a year. Mines may be found in early July and in October. The two imagos in my collection appeared July 25 and May 1 respectively.

The position of the imago at rest reminds one of a small species of *Ornix*.

Marmara auratella, n. sp.

Head and thorax dark brown, with a distinct bronzy lustre; face metallic gray. Labial palpi bronzy, third segment with the apical half whitish. Maxillary palpi with the last segment pale. Antennæ dark brown.

Fore wings bronzy brown, with an almost golden lustre under brilliant illumination. The markings are brilliant silvery white and are situated as follows: At the basal fourth a fascia nearly straight on its inner margin, but broadening outwardly below the fold; at the middle of the wing a somewhat oblique costal streak, and nearly opposite it, but a little farther back on the dorsal margin, an erect dorsal streak; at the apical third a triangular costal streak almost meeting the apex of a similar dorsal streak; just before the tip a narrow costal streak, nearly crossing the wing. Cilia dark brown, shining white opposite the apex. Hind wings dark brownish gray, cilia concolorous.

Legs dark brown, with broad silvery annulations. Abdomen beneath with segments silvery posteriorly.

Expanse: 6.5 mm.

Two specimens, Cincinnati, O., bred from long serpentine mines on stems of the cultivated form of *Rudbeckia laciniata* L., the "Golden Glow" of gardens. I have searched for the mines on the stems of the wild plants, both here and elsewhere, without success. The mine, which is very similar to that of *Marmara salictella* on willow, is usually situated toward the lower part of the stem. The larva mines just beneath the epidermis usually working downwards, although the mine crosses on itself many times.

At the time of pupation the larva departs widely from the well-known habits of all the other species of the genus. Previous to this time the mine has been placed just beneath the epidermis. At maturity the larva cuts through the epidermis and two layers of bark beneath it around the end of the mine and for a distance of 3 or 4 mm. on each side. This elongate flap of tissue which hangs with its free end downward is then bent into a fold which causes it to project beyond the contour of the stem. The cocoon is spun on the under side of the flap, so that its lower surface is visible if the flap is lifted up. At the anterior end of the cocoon a slit is cut in the lower layer of loosened bark and through this opening a passage lined with silk leads to the exterior, so that at emergence the pupa is thrust out between the two layers of loosened bark at the lower end of the flap. The pearly globules, so characteristic of the cocoons of the other species of the genus, are entirely absent in this instance. In other respects this species agrees with the characteristics of the genus.

There are two generations a year. The larvæ of the first generation pupate toward the end of July and produce imagos in early August. The larvæ of the second generation pupate in October, but the imagos do not appear until the first of the following June.

The imago is nearest to *M. arbutiella* Bsk.

Marmara apocynella, n. sp.

Head whitish on face, becoming distinctly yellowish on the vertex, with some fuscous scales behind. Palpi whitish, the second segment of the labial palpi tipped with black. Antennæ gray.

Fore wings black; a straight white fascia at basal fourth; an oblique fascia at the middle, a little angulated near the dorsum; at two-thirds, a triangular costal spot and opposite it a small inconspicuous dorsal spot; a white costal streak before the apex. Cilia white opposite the apex, elsewhere gray. Hind wings and cilia gray, tinged with yellow.

Legs black, annulate with white; first tarsal segment black with a white tip, remaining segments pure white with an occasional black spot near the tip. Abdomen black above, grayish beneath.

Expanse: 5 mm.

One specimen, bred from a long whitish serpentine mine on the stem of dogbane (*Apocynum cannabinum* L.). The larva leaves the mine to pupate, and spins the characteristic white cocoon ornamented with pearly globules. Mine collected near Cincinnati, July 3, at which time the larva was nearly full grown. Imago, July 21.

This species comes very close to *Marmara salictella* Clem., from which it may be distinguished by the yellow head, more oblique median fascia and smaller size.

Cystiæcetes, new genus.

Head with appressed scales; ocelli present; tongue developed. Antennæ $\frac{2}{3}$, outer half very shortly bipectinate and ciliate in both sexes, basal segment rather long, without pecten. Labial palpi long, recurved, second segment thickened with scales, terminal segment shorter, thickened with scales, apex acute. Maxillary palpi very short, appressed to tongue.

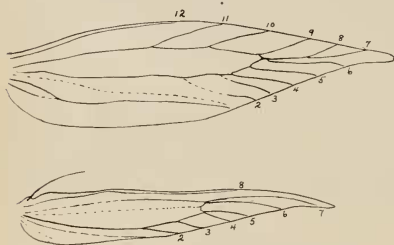


Fig. 21.—Venation of *Cystiæcetes nimbosus*.

Posterior tibiae rough-haired above on the posterior half.

Fore wings with large tufts of raised scales; 1b furcate, 2 from three-fourths of cell, tubular only near the margin, 4 from angle, 6 out of base of stalk of 7+8, 11 from middle of cell. Hind wings $\frac{2}{5}$, narrow lanceolate, cilia 5; 2 - 4 nearly parallel, 4 and 5 connate, 5 and 6 parallel, 6 and 7 approximated at base. (Fig. 21).

Type: *Cystiæcetes nimbosus*.

This genus is closely related to *Chrysopeleia* Cham., which it very closely resembles in type of markings; the antennal and palpal characters are identical. In *Chrysopeleia* vein 2 of the fore wings is absent, and 6 is out of 7 beyond 8; the venation of the hind wings differs only in the staking of 6 and 7. It appears to bear some resemblance to some Australian genera in antennal structure and in neurulation of the hind wings.

***Cystiöcetes nimbosus*, n. sp.**

Head gray; scales on the under surface of the palpi becoming white-tipped towards the ends of the segments. Antennæ dark gray. Fore wings gray, microscopically speckled with whitish. Scale tufts almost black, the scales composing them tipped with white; a large tuft below fold at basal third, another below the middle of the costa; a smaller tuft on the dorsum a little behind the middle; a fourth small tuft at end of cell; two very small tufts on termen before apex. Hind wings and cilia gray.

Legs dark gray, tips of segments whitish.

Expanse: 10.5-12 mm.

Thirteen specimens, Mills College, Alameda Co., Cal., and Camp Baldy, San Bernardino Co., Cal., bred from larvæ on "Cas-cara" (*Rhamnus purshiana* DC.), an evergreen, and also on a similar deciduous species of *Rhamnus*.

The larva feeds within a large inflated gall-like chamber formed from the two halves of the leaf, which are closely appressed above, just below the margins of the leaf, and near each end. The leaf bulges between the lateral veins forming a series of pouches projecting from the large elongate chamber. (Fig. 22). The



Fig. 22.—Larval dwelling of
Cystiöcetes nimbosus.

larva is pale grayish brown, with head and prothoracic shield shining pale brown. A small silken cocoon is spun, often just outside the larval habitation, where the sides of the leaf diverge, or between leaves on the bottom of the breeding jar.

***Antispila aurirubra*, n. sp.**

Head and palpi bronzy; antennæ dark brown. Thorax and fore wings very lustrous, colour varying, according to the direction of light from greenish golden to a brilliant reddish bronze. The latter colour predominates near the base and along the termen and around the apex of the wing. At one-third a narrow pale golden fascia, somewhat nearer base on the dorsum; at two-thirds a triangular costal spot, and a little nearer the base on the dorsum a similar dorsal spot, with its apex produced and pointing obliquely toward the middle of the costa. Cilia dark gray. Hind wings dark gray, purple toward the apex, with golden brown cilia.

Legs bronzy brown, hind tarsi tipped with pale yellow.

Expanse: 7-8 mm.

Two specimens, Fredalba, San Bernardino Co., Cal. Larva in brownish blotches in leaves of a species of *Cornus*. The completed case appears somewhat truncate at each end. Mines received, August 6; imagos emerged May 21 and 25.

More closely allied to *A. nyssæfoliella* than to any other species, but the more reddish colour and the more slender fascia will separate the two species.

Obrussa, new genus.

Head and face tufted. Antennæ $2\frac{2}{3}$, simple in ♂, basal segment enlarged and concave beneath to form an eye-cap. Labial palpi well developed, porrected. Maxillary palpi long, filliform, folded. Tongue rudimentary.

Posterior tibiae with spines above; middle spurs above the middle of the tibiae.

Fore wings elongate ovate; 1b simple at base, 2 becoming obsolete shortly beyond transverse vein, which closes the cell before the middle of the wing, 3 and 4 absent, 5 and 6 stalked, the stalk out of 8, 7 to costa out of 8, 9 absent. Hind wings a little over $1\frac{1}{2}$, cilia $2\frac{1}{2}$; 1c faintly visible, 3 and 4 absent, 6 absent, 5 and 7 stalked from before middle, cell open between 2 and 5. Frenulum of many spines. (Fig. 23).

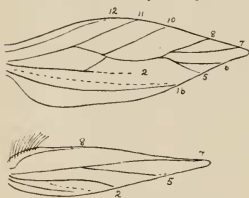


Fig. 23.—Venation of *Obrussa ochrifasciella*.

Type: *Obrussa ochrifasciella* Chambers (Can. Ent., V, 128, 1873.).

The genus seems to approach *Ectademia* Bsk. more closely than any of the other allied genera; from *Ectademia* it differs chiefly in the presence of vein 5 of the fore wings and in the position of the spurs of the hind tibiae, which are situated above instead of below the middle. *Obrussa* is relatively somewhat shorter and broader winged than either *Ectademia* or *Nepticula*.

In describing *Nepticula ochrifasciella*, Chambers probably had before him males only, which are uniformly smaller than females, and alone show the distinct ochreous under surface of the basal

half of the fore wings. A fuller description embracing both sexes is here given:

Palpi pale ochreous. Tuft on face and head reddish ochreous. Antennæ fuscous, eye-caps ochreous.

Thorax and basal third of the fore wings black, apical two-thirds tinged with brown. A broad pale ochreous fascia crosses the wing at the basal third. From base to outer edge of fascia on costa, and nearly to tornus on dorsum, the under side of the wing in the ♂ is ochreous; in the ♀, this area though paler is not definitely outlined. At two-thirds are some scattered paler scales, sometimes (in ♀) forming an indistinct line across the wing. Cilia around the apex and last row of scales at the extreme apex pale ochreous. Cilia elsewhere concolorous with the wing. Hind wings gray, cilia concolorous.

Legs dull ochreous, mixed with fuscous; outer surface of fore and middle tibiae and tarsi dark brown.

Expanse: 6.5 mm. (♂); 7-8 mm. (♀).

I have always found this species resting on leaves of saplings in dense woods with sparse undergrowth. The specimens in my collection were taken May 30 to July 6; a single specimen is dated August 5. I have thus far no clue to its life history.

BOOK REVIEWS.

THE HOUSE-FLY. ITS STRUCTURE, HABITS, DEVELOPMENT, RELATION TO DISEASE AND CONTROL. By C. Gordon Hewitt, D.Sc., F.R.S.C., Dominion Entomologist, 382 pp., 105 figs., Cambridge, at the University Press, 1914. Price 15 shillings net.

It is unusual to find a book dealing with as wide variety of subjects as this one, that does not show some inequality of treatment when carefully analyzed. The author generally reveals the fact that he is more at home in some branches of the subject than in others. Of Dr. Hewitt's book this cannot be said. Whether he discusses questions of minute anatomy or parasitology, bacteriology or the practical problems concerned with public health, he shows a thoroughness of grasp and a clearness of diction only possessed by the master.

The present work is an outgrowth of Dr. Hewitt's admirable monograph on the House-fly, which first appeared in three parts